

WHAT IS CLAIMED IS:

1. A cleaning liquid dispensing system for use in a mobile hard surface cleaner comprising:

a cleaning agent container configured to contain a supply of cleaning agent;

a cleaning agent supply line coupled to the cleaning agent container;

a flow control device having a first input coupled to the cleaning agent supply line, a second input, and an output; and

a pressure regulator in line with the cleaning agent supply line between the first input of the flow control device and the cleaning agent container, the pressure regulator adapted to control a pressure in the cleaning agent supply line.

2. The system of claim 1, wherein:

the cleaning agent supply line defines a cleaning agent flow path; and

the pressure regulator includes an air inlet port and an airflow path between the air inlet port and the cleaning agent flow path.

3. The system of claim 2, wherein the pressure regulator includes a valve operable between an open position in which the airflow path is open, and a closed position in which the airflow path is closed.

4. The system of claim 2, wherein the pressure regulator includes a check valve in the airflow path.

5. The system of claim 1 including a metering device in line with the cleaning agent supply line and between the flow control device and the cleaning agent container.

6. The system of claim 5, wherein the metering device includes an orifice plate having an orifice.

7. The system of claim 6, wherein the orifice has a diameter of .010 inches or less.

8. The system of claim 5, wherein the metering device includes a labyrinthine fluid flow path in line with the cleaning agent supply line.

9. The system of claim 5, wherein the metering device includes a needle valve.

10. The system of claim 1, wherein the flow control device includes an injector component configured to receive a flow of cleaning agent through the first

input, inject the flow of cleaning agent into a flow of primary cleaning liquid component received through the second input to thereby form a flow of cleaning liquid, and discharge the flow of cleaning liquid through the output.

11. The system of claim 10 including a cleaning liquid distributor coupled to the outlet of the flow control device and configured to receive the flow of cleaning liquid and discharge the flow of cleaning liquid to a hard surface.

12. The system of claim 10, wherein the injector component is a venturi injector.

13. The system of claim 1, wherein the cleaning agent container is collapsible.

14. The system of claim 13, wherein the cleaning agent container is a collapsible bag.

15. The system of claim 13, wherein the cleaning agent container is a removable cleaning agent cartridge.

16. The system of claim 1, including an aerator having an inlet coupled to the output of the flow control device, an outlet, and a gas inlet.

17. The system of claim 16, wherein:

the flow control device is configured to receive a flow of cleaning agent at the first input, combine the flow of cleaning agent with a flow of primary cleaning liquid component received at the second input, and discharge a flow of cleaning liquid at the output; and the aerator is configured to receive the flow of cleaning liquid from the output of the flow control device at the inlet, inject gas into the flow of cleaning liquid through the gas inlet, and discharge an output flow of foamed cleaning liquid through the outlet.

18. The system of claim 17 including a cleaning liquid distributor coupled to the outlet of the aerator and configured to receive the flow of foamed cleaning liquid and discharge the flow of foamed cleaning liquid for wetting of a surface.

19. The system of claim 18, wherein the distributor is configured to direct the flow of foamed cleaning liquid directly to a hard floor surface.

20. The system of claim 18, wherein the distributor is configured to direct the flow of foamed cleaning

liquid onto or adjacent to a scrubbing member of a motorized scrubber.

21. The system of claim 18, wherein the distributor includes distributing conduit having a first end coupled to the outlet of the aerator.

22. The system of claim 21, wherein the distributing conduit includes a section having a plurality of apertures.

23. The system of claim 21, wherein the distributing conduit includes a substantially horizontal section having a closed end and a plurality of apertures in a topside.

24. The system of claim 18, wherein the distributor includes a wand member through which the flow of foamed cleaning liquid is discharged.

25. The system of claim 24, wherein the wand member includes the aerator and a section of tubing connecting the inlet of the aerator to the output of the flow control device.

26. The system of claim 17, wherein the flow of foamed cleaning liquid is proximately 0.5 gallons per minute or less.

27. A cleaning liquid dispensing system for use in a mobile hard surface cleaner comprising:

- a cleaning agent container configured to contain a supply of cleaning agent;
- a cleaning agent supply line coupled to the cleaning agent container;
- a flow control device having a first input coupled to the cleaning agent supply line, a second input, and an output;
- a pressure regulator in line with the cleaning agent supply line between the first input of the flow control device and the cleaning agent container, the pressure regulator adapted to control a pressure in the cleaning agent supply line; and
- an aerator including an inlet coupled to the output of the flow control device, an outlet, and a gas inlet.

28. The system of claim 27, wherein:

- the cleaning agent supply line defines a cleaning agent flow path; and
- the pressure regulator includes an air inlet port and an air flow path between the inlet port and the cleaning agent flow path.

29. The system of claim 28, wherein the pressure regulator includes a valve operable between an open position in which the airflow path is open, and a closed position in which the airflow path is closed.

30. The system of claim 28, wherein the pressure regulator includes a check valve in line with the airflow path.

31. The system of claim 27 including a metering device in line with the cleaning agent supply line and between the flow control device and the cleaning agent container.

32. The system of claim 31, wherein the metering device includes an orifice plate having an orifice.

33. The system of claim 32, wherein the orifice has a diameter of .010 inches or less.

34. The system of claim 31, wherein the metering device includes a labyrinthine fluid flow path in line with the cleaning agent supply line.

35. The system of claim 31, wherein the metering device includes a needle valve.

36. The system of claim 27, wherein the flow control device includes an injector component configured to

receive a flow of cleaning agent through the first input, inject the flow of cleaning agent into a flow of primary cleaning liquid component received through the second input to thereby form a flow of cleaning liquid, and discharge the flow of cleaning liquid through the output.

37. The system of claim 36 including a cleaning liquid distributor coupled to the outlet of the flow control device and configured to receive the flow of cleaning liquid and discharge the flow of cleaning liquid to a hard surface.

38. The system of claim 36, wherein the injector component is a venturi injector.

39. The system of claim 27, wherein the cleaning agent container is collapsible.

40. The system of claim 39, wherein the cleaning agent container is a collapsible bag.

41. The system of claim 39, wherein the cleaning agent container is a removable cleaning agent cartridge.

42. The system of claim 27, wherein:

the flow control device is configured to
receive a flow of cleaning agent at

the first input, combine the flow of cleaning agent with a flow of primary cleaning liquid component received at the second input, and discharge a flow of cleaning liquid at the output; and the aerated is configured to receive the flow of cleaning liquid from the output of the flow control device at the inlet, inject gas into the flow of cleaning liquid through the gas inlet, and discharge an output flow of foamed cleaning liquid through the outlet.

43. The system of claim 42 including a cleaning liquid distributor coupled to the outlet of the aerator and configured to receive the flow of foamed cleaning liquid and discharge the flow of foamed cleaning liquid for wetting of a surface.

44. The system of claim 43, wherein the distributor is configured to direct the flow of foamed cleaning liquid directly to a hard floor surface.

45. The system of claim 43, wherein the distributor is configured to direct the flow of foamed cleaning liquid onto or adjacent to a scrubbing member of a motorized scrubber.

46. The system of claim 43, wherein the distributor includes distributing conduit having a first end coupled to the outlet of the aerator, whereby the flow of foamed cleaning liquid discharged through the outlet of the aerator is received by the distributing conduit.

47. The system of claim 46, wherein the distributing conduit includes a section having a plurality of apertures.

48. The system of claim 46, wherein the distributing conduit includes a substantially horizontal section having a closed end and a plurality of apertures in a topside.

49. The system of claim 43, wherein the distributor includes a wand member through which the flow of foamed cleaning liquid is discharged.

50. The system of claim 49, wherein the wand member includes the aerator and a section of tubing connecting the inlet of the aerator to the output of the flow control device.

51. The system of claim 27, wherein the flow of foamed cleaning liquid is proximately 0.5 gallons per minute or less.

52. A hard floor surface cleaner comprising:

- a mobile body;
- a tank carried by the mobile body and configured to contain a supply of primary cleaning liquid component;
- a cleaning agent container configured to contain a supply of a cleaning agent;
- a cleaning agent supply line coupled to the cleaning agent container;
- a flow control device having a first input coupled to the cleaning agent supply line, a second input coupled to the tank, and an output; and
- a pressure regulator in line with the cleaning agent supply line between the first input of the flow control device and the cleaning agent container, the pressure regulator adapted to control a pressure in the cleaning agent supply line.

53. The system of claim 52 including an aerator having an inlet coupled to the output of the flow control device, an outlet, and a gas inlet.

54. The system of claim 52, wherein:

- the cleaning agent supply line defines a cleaning agent flow path; and

the pressure regulator includes an air inlet port and an air flow path between the inlet port and the cleaning agent flow path.

55. The system of claim 54, wherein the pressure regulator includes a valve operable between an open position in which the airflow path is open and a closed position in which the airflow path is closed.

56. The system of claim 54, wherein the pressure regulator includes a check valve in line with the airflow path.

57. The system of claim 52 including a metering device in line with the cleaning agent supply line and between the flow control device and the cleaning agent container.

58. The system of claim 57, wherein the metering device includes an orifice plate having an orifice.

59. The system of claim 58, wherein the orifice has a diameter of .010 inches or less.

60. The system of claim 57, wherein the metering device includes a labyrinthine fluid flow path in line with the cleaning agent supply line.

61. The system of claim 57, wherein the metering device includes a needle valve.

62. The system of claim 52, wherein the flow control device includes an injector component configured to receive a flow of cleaning agent through the first input, inject the flow of cleaning agent into a flow of primary cleaning liquid component received through the second input to thereby form a flow of cleaning liquid, and discharge the flow of cleaning liquid through the output.

63. The system of claim 62 including a cleaning liquid distributor coupled to the outlet of the flow control device and configured to receive the flow of cleaning liquid and discharge the flow of cleaning liquid to a hard surface.

64. The system of claim 62, wherein the injector component is a venturi injector.

65. The system of claim 52, wherein the cleaning agent container is collapsible.

66. The system of claim 65, wherein the cleaning agent container is a collapsible bag.

67. The system of claim 65, wherein the cleaning agent container is a removable cleaning agent cartridge.

68. The system of claim 52, wherein:

the flow control device is configured to receive a flow of cleaning agent at the first input, combine the flow of cleaning agent with a flow of primary cleaning liquid component received at the second input, and discharge a flow of cleaning liquid at the output; and the aerated is configured to receive the flow of cleaning liquid from the output of the flow control device at the inlet, inject gas into the flow of cleaning liquid through the gas inlet, and discharge an output flow of foamed cleaning liquid through the outlet.

69. The system of claim 68 including a cleaning liquid distributor coupled to the outlet of the aerator and configured to receive the flow of foamed cleaning liquid and discharge the flow of foamed cleaning liquid for wetting of a surface.

70. The system of claim 69, wherein the distributor is configured to direct the flow of foamed cleaning liquid directly to a hard floor surface.

71. The system of claim 69, wherein the distributor is configured to direct the flow of foamed cleaning liquid onto or adjacent to a scrubbing member of a motorized scrubber.

72. The system of claim 69, wherein the distributor includes distributing conduit having a first end coupled to the outlet of the aerator, whereby the flow of foamed cleaning liquid discharged through the outlet of the aerator is received by the distributing conduit.

73. The system of claim 72, wherein the distributing conduit includes a section having a plurality of apertures.

74. The system of claim 72, wherein the distributing conduit includes a substantially horizontal section having a closed end and a plurality of apertures in a topside.

75. The system of claim 69, wherein the distributor includes a wand member through which the flow of foamed cleaning liquid is discharged.

76. The system of claim 75, wherein the wand member includes the aerator and a section of tubing

connecting the inlet of the aerator to the output of the flow control device.

77. The system of claim 68, wherein the flow of foamed cleaning liquid is proximately 0.5 gallons per minute or less.